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JC918 U.S. PTO 08/28/00

UTILITY PATENT APPLICATION TRANSMITTAL 22193

PATENT TRADEMARK OFFICE

Address to: Box PATENT APPLICATION Assistant Commissioner for Patents Washington, DC 20231	Attorney Docket No.	1730/USW1730PUS
	Inventor(s) or Application Identifier: Joseph J. Knudsen et al	

JC901 U.S. PTO 09/649864 08/28/00

1. This application entitled METHOD AND SYSTEM FOR VERIFYING MODEM STATUS is:

   a. _x_ A new application under 37 C.F.R. §1.53(b).

   b. ___ A ___ continuation ___ divisional or ___ continuation-in-part application under 37 C.F.R. § 1.53(b) of prior application Serial No. _____ filed on _____, entitled _____.

Application elements and other attached papers:

2. _x_ Specification (incl. Claims and Abstract) [Total Pages 16]

3. _x_ Drawings (_x_ informal ___ formal) [Total Sheets 4]

4. __ Oath or Declaration

   a. __ Newly-executed

   b. ___ Copy from a prior application (37 C.F.R. § 1.63(d))

5. ___ Incorporation By Reference: The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Item 4b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.

6. ___ This application is filed by fewer than all the inventors named in the prior application, 37 C.F.R. § 1.53(d)(4).

   a. ___ ***DELETE*** the following inventor(s) named in the prior nonprovisional application:

   _____

   _____

   b. ___ The inventor(s) to be deleted are set forth on a separate sheet attached hereto.

CERTIFICATION UNDER 37 C.F.R. § 1.10

I hereby certify that this UTILITY PATENT APPLICATION TRANSMITTAL and the documents referred to as attached therein are being deposited on the below date with the United States Postal Service in an envelope as "Express Mail Post Office to Addressee" addressed to: Box Patent Application, Assistant Commissioner for Patents, Washington, D.C. 20231.

Express Mail Label No. EK758486421US

Date of Deposit: August 28, 2000

Paul M. Schwartz
(Type or print name of person mailing paper)

(Signature of person mailing paper)

7. Preliminary Amendment:

a. ___ A Preliminary Amendment is attached.

b. ___ Cancel in this application original claims _____ of the prior application before calculating the filing fee.

c. ___ Please amend the specification by inserting before the first line the sentence:

"This is a

___ continuation

___ divisional

of copending application(s)

___ Serial number ___ /_____ filed on _____."

d. ___ A Petition to Suspend Prosecution For The Time Necessary to File An Amendment (New Application Filed Concurrently) is attached.

8. Small entity status:

a. ___ A small entity statement is attached.

b. ___ A small entity statement was filed in the prior nonprovisional application and such status is still proper and desired.

c. ___ Is no longer desired.

9. Fee Calculation:

FOR	NUMBER FILED	NUMBER EXTRA	RATE	CALCULATIONS
TOTAL CLAIMS (37 C.F.R. § 1.16(c))	18 -20 =	--	X 18.00	--
INDEPENDENT CLAIMS (37 C.F.R. § 1.16(b))	4 -3 =	1	X 78.00	78.00
MULTIPLE DEPENDENT CLAIMS (if applicable) (37 C.F.R. §1.16(d))			260.00	--
			BASIC FEE (37 C.F.R. § 1.16(a))	760.00
		Total of above Calculations =		690.00
Reduction by 50% for filing by small entity (Note 37 C.F.R. §§ 1.9, 1.27, 1.28)				--
			Assignment Recordal Fee 40.00	
			TOTAL =	768.00

10. ___ A check in the amount of $_____ is enclosed.

11. _x_ The Commissioner is hereby authorized to credit overpayments or charge the following fees (or any deficiency therein) to Qwest Deposit Account No. 21-0456 :

a. _x_ Fees required under 37 C.F.R. § 1.16.

b. _x_ Fees required under 37 C.F.R. § 1.17.

12. Maintenance of Copendency of Prior Application

___ A request for extension of time and the appropriate fee have been filed in the pending **prior** application (or are being filed in the prior application concurrently herewith) to extend the period for response until _____.

13. ___ An Information Disclosure Statement (IDS) is attached, along with the following indicated attachments thereto:

a. ___ Form PTO/SB/08A (_1_____ sheet(s))

b. ___ Copies of references cited

14. ___ Certified copy of priority document(s)

15. _x_ Return Receipt Postcard

16. ___ Other: _____

17. __ An Assignment of the invention to Qwest Communications International Inc.

a. __ is attached.

b. ___ was recorded on _____ at Reel _____, Frame _____.

18. The power of attorney in the prior application is to:

_____
Name of Attorney of Record Reg. No.

___ The power appears in the original papers in the prior application.

___ The power does not appear in the original papers, but was filed on _____.

___ A new power has been executed and is attached.

19. Correspondence Address: Please address all future communications to:

Peter J. Kinsella _____,

22193

PATENT TRADEMARK OFFICE

Telephone: 877-879-4747 or 303-672-2700; Fax: 303-308-9456

Respectfully submitted,

Date 8-28-00

Name: Paul M. Schwartz
Registration No.: 33,278

x Attorney or agent of record
___ Filed under Rule 34(a)

METHOD AND SYSTEM FOR VERIFYING MODEM STATUS

TECHNICAL FIELD

This invention relates to a method and system for verifying modem status for a telecommunication system and more particularly to verifying modem status in real-time of an internet subscriber service.

BACKGROUND ART

Digital Subscriber Line signal architectures, generally denoted as DSL, provide simultaneous voice and high-speed data services over a signal copper wire pair. DSL allows data transmission at speeds much faster than the best available analog modems. There exist several variations of DSL systems that use copper wire cabling to move data between the site and the serving central office. Data, voice and video are separated at the serving central office. Voice is delivered to the public switched telephone network while data is delivered to the host destination over high speed service access links.

As and example, ADSL or Asymmetric Digital Subscriber Line services generally use existing unshielded twisted pair (UTP) copper wires from a telephone company's central office to the subscriber's premise, utilize electronic equipment in the form of ADSL modems at both the central office and the subscriber's premise, send high-speed digital signals up and down those copper wires, and send more information one way than the other. The

ADSL type of DSL services is capable of providing a downstream bandwidth of approximately 1.5 Mbps - 8 Mbps, and upstream bandwidth of about 16 Kbps - 64 Kbps with loop distances ranging from about 3.7 km - 5.5 km. DSL or High bit rate Digital Subscriber Line services provide a symmetric, high performance connection over a shorter loop, and typically require two or three copper twisted pairs. DSL is capable of providing both upstream and downstream bandwidth of approximately 1.5 Mbps, over loop distances of up to approximately 3.7 km. DSL or single line digital services provide a symmetric connection that matches DSL performance using a single twisted pair, but operating over a shorter loop of up to approximately 3.0 km.

DSL services are typically implemented in an asymmetric form having a downstream transmission capability of approximately 52 Mbps over twisted pair copper wire arranged in local loops of 300 m, 26 Mbps at 1,000 m, and 13 Mbps at 1,500 m. Upstream data rates in asymmetric implementations tend to range from approximately 1.6 Mbps to approximately 2.3 Mbps. As though skill in the art will recognize, a typical distribution system includes a central office equipped with a Host Digital Terminal (HOT) and arranged to operate as a hub between multiple Video Information Providers (VIPs)/Digital Service Providers (DIPS) and customer residential dwellings. In a Fiber-To-The-Neighborhood (FTN) type distribution system, optic fiber (e.g. OC-3c and OC-12c) lines are used to connect the central office to a Universal System Access Multiplexer (USAM), which is then connected to a Network Interface Device (NID) located on the customer property via twisted pair copper wire. A dedicated DSL loop extends between the NID and an individual customer residence using an existing POTS or telephone system twisted pair wire, and a customer interface device, such as a residential

gateway or set top box, provides a connection point for a customer display device such as a television or personal computer. A Fiber-To-The-Curb (FTTC) type distribution system is similar except that a Broadband Network Unit (BNU) is used in place of the USAM, and coaxial cable is used to connect the BNU, NID, and set top box.

The DSL signal format is used to carry signals to and from the customer. In these systems, the central office provisions each user for programming access rights, and maintains a profile database for each provisioned customer at the HOT to control the signals/channels that can be viewed by the customer.

The improvements in DSL technology are reducing access costs and increasing DSL subscribers. Improvements in access speed and ease of use are making DSL attractive for home, small business and some large business users. Full time access or connectivity has reduced call set-up time delay and eliminates getting "bumped" off the network. DSL speeds may vary from part time 256 Kps speeds to 7Mbps downstream/upstream for intensive business users. Further improvements in DSL's is allowing high-speed digital communications connections on voice lines. Subscribers have the ability to continue making voice calls while transmitting data, receiving files or working on the Internet.

Due to the improvements noted, more and more subscribers are connecting to the Internet via DSL connections. It has become important for Internet Service Providers (ISP's) to provide better and faster service. As the ISP is the connection from the subscriber to the Internet, the subscriber is reliant on the ISP for

any utilization of the Internet or network related service using the DSL. The ISP service ideally wishes to limit downtime due to faulty connections to a minimum. Currently, the ISP is blind to a subscriber's connection status. If a connection issue occurs for any reason, the customer is dependent upon the ISP to assist in troubleshooting the connection. The ISP initially may trouble shoot at the ISP end but is often required to phone the DSL service and request status. This phone request is very time consuming for the ISP as well as for the DSL service provider. Further, multiple requests for status are often difficult to satisfy for the DSL provider. In some circumstances real time responses are very difficult due to numerous status requests from multiple ISP's.

New subscriber connection status is as important as current subscriber connection status. New subscribers often have multiple hardware and software related concerns that must be addressed for proper DSL connections status. Having an accurate real-time status of the DSL connection is very useful in new subscriber connection troubleshooting. Consequently, a need has developed for a method and system for verifying modem status.

DISCLOSURE OF INVENTION

It is the principal object of the present invention to provide a method and system for verifying modem connection via an internet website.

It is another object of the present invention to provide an ISP with the capability to check modem status in real-time via known website interface technology.

It is still another object of the present invention to provide an ISP with the capability to troubleshoot modem connections by allowing the ISP to independently verify customer connections at the DSLAM of the respective central office.

In carrying out the above objects, there is provided a method for verifying modem status for an telecommunications service provider in a communications network serviced by a central office. The method comprises connecting to an internet interface and transmitting a modem status request to the internet interface. The modem status request is transferred from the internet interface to a server and subsequently transmitted an integrator whereby the integrator interprets the modem status request and retrieves corresponding subscriber information. The corresponding subscriber information is transferred to the server and then converted to a central office request and eventually sent to the central office. The request queries modem status of a customer and creates a status signal which is transmitted back to the server. The server transmits the status signal from the server to the internet interface and converts the status signal to a readable format for the telecommunications service provider indicating status as "trained", "not trained" or "training".

In carrying out the above method, there is provided a system that automates the above steps. The system comprises a web server having an internet website interface for receiving a modem status request from the internet service provider via the internet, an integrator capable of retrieving subscriber location information and a status server connected to the web server for receiving the modem status request and transmitting the request to the integrator whereby the integrator interprets the modem status request and retrieves corresponding subscriber location information. The integrator transmits the corresponding subscriber information to the status server and the status server thereby converts the corresponding subscriber information to a central office DSLAM request and sends the central office DSLAM request to the central office DSLAM. The central office DSLAM responds to the request and transmits a status signal to the status server and the status server transmits the signal to the webserver which converts the signal to a readable format on the internet website interface for viewing by the internet service provider.

These and other objects, features, and advantages of the present invention will become more readily apparent by reference to the following description of the drawings wherein like reference numerals correspond to like components.

BRIEF DESCRIPTION OF DRAWINGS

FIGURE 1 is a schematic diagram of the system for verifying modem status of the present invention;

FIGURE 2 is a flow diagram of the method for verifying modem status of the present invention;

FIGURE 3 is a representative web interface illustrating DSL subscribers; and

FIGURE 4 is a representative web interface illustrating modem status.

BEST MODE FOR CARRYING OUT THE INVENTION

With reference to Fig. 1 of the drawings, there is shown a generalized schematic of the system 10 of the present invention. As discussed above, when an ISP 12, using a computer system 14 desires to check modem status, the ISP 12 connects to the Internet 16 via common Internet connections methods. The ISP will connect up to the appropriate internet interface or internet web site 18 by having the appropriate Internet addresses previously provided by the DSL service provider or by using appropriate search techniques if necessary. The internet web site 18 is resident on a web server 20. Any common web server such as the Apache Group's Apache Web Server or Microsoft IIS is envisioned for the web server 20 system component.

Web server 20 is connected and in communication with status server 22. Status server 22, in the preferred embodiment is a UNIX inetd server that is capable of listening on a UNIX socket (port 7895) on two production servers. The status server 22 is connected and in communication with a database 24. The database 24, in the preferred embodiment contains useful customer information. As shown in FIGURE 1, status server 22 is capable of communicating with a DSLAM 26 at the central office 28. The DSLAM 26 is in communication with the DSL modem 30 which is connected to the ultimate customer or subscriber 32.

In the preferred embodiment, the method as described in FIGURE 2, comprises using a digital broadband network serviced by a central office 26. The ISP 12 connects to webserver 20 using having an internet website interface 18. As shown in FIGURE 3, the website interface 18 includes a list 34 of telecommunications service provider customers 36. Each customer 36 has a corresponding phone number 38. In this manner the ISP can easily designate the appropriate customer 36 from the list 34. If a customer calls the ISP with trouble in connection, the ISP can begin the trouble shooting procedure by picking or designating from the list 34 the appropriate customer. In choosing the customer from the list 34, the ISP has through the use of the website interface18 transmitted a modem status request 40 to the webserver 20 via the website interface 18.

The webserver 20 transfers the modem status request 40 from the webserver 20 to a status server 22. As discussed above, the status server, in the preferred embodiment is a UNIX inetd server. The status server 22 handles multiple simultaneous requests in real time. The modem status request 40, now in the form of a telephone number 38 is transmitted from the status server

22 to an integrator 24. The status server does what is known in the art as SQL to the integrator 24. The integrator 24 interprets the modem status request 40 in the form of phone number 38 and retrieves corresponding subscriber location information 42. This subscriber location information 42 may be in the form of customer node and port records for which the DSLAM 28 the customer 12 is provisioned on. The integrator 24 transits the customer node and port records or corresponding subscriber location information 42 to the status server 22.

The status server converts the corresponding subscriber location information 42 to a central office DSLAM request 44. In the art, the central office DSLAM request 44 is also known as a SNMP request. This central office DLSAM request 44 is sent to the corresponding central office DSLAM 28. This request queries the modem status of a customer the DSLAM creates a status signal. This status signal 46 is related to the status of the modem and is "connected", "not connected" or "connecting" or also known as "trained", "not trained" or "training". Status signal 46 is transmitted to status server 22. Status server 22 transits the status signal 46 from the status server 46 to the web server 20 all in real time.

The webserver 20 converts the status signal 46 to a website interface 18a, as shown in FIGURE 4 which is in a readable format. More specifically, the status of "trained", "not trained" or "training" is viewable in a graphical and textual format which is easily readable by the ISP. This real time information greatly enhances the ISP trouble shooting and set-up capabilities for use with the customer.

While embodiments of the invention have been illustrated and described, it is not intended that these embodiments illustrate and describe all possible forms of the invention. Rather, the words used in the specification are words of description rather than limitation, and it is understood that various changes may be made without departing from the spirit and scope of the invention.

WHAT IS CLAIMED IS:

1. A system for verifying modem status for a telecommunications service provider in a broadband network serviced by a central office, the system comprising: an internet interface for receiving a modem status request from the telecommunications service provider via a telecommunications network; an integrator capable of retrieving subscriber information; a server connected to said internet interface for receiving said modem status request and transmitting said modem status request to said integrator whereby said integrator interprets said modem status request and retrieves corresponding subscriber information and transmits said corresponding subscriber information to said server, said server thereby converting said corresponding subscriber information to a central office request and sending said central office request to said central office, said central office responding to said request and transmitting a status signal to said server and said server transmitting said signal to said internet interface which converts said status signal to a readable format for said telecommunications service provider.

2. The system of claim 1 wherein said internet interface is a web server having an internet web site resident therein containing a list of telecommunications service provider customers.

3. The system of claim 2 wherein said modem status request is a designation of a customer from said list of telecommunications service provider customers.

4. The system of claim 3 wherein said modem status request is a telecommunications service provider customer telephone number.

5. The system of claim 4 wherein said subscriber information is customer node and port records.

6. The system of claim 1 wherein central office includes a DSLAM and said central office request is a SNMP request corresponding to the DSLAM.

7. The system of claim 1 wherein said readable format for said telecommunications service provider is a web site interface.

8. The system of claim 1 wherein said status signal includes a status from a list of connected, not connected or connecting.

9. The system of claim 1 wherein said status signal is provided to said telecommunications service provider in real-time.

10. The system of claim 1 wherein said server is capable of receiving multiple status requests.

11. A system for verifying modem status for an internet service provider in a digital broadband network serviced by a central office, the system comprising: a web server having an internet website interface for receiving a modem status request from the internet service provider via the internet; an integrator capable of retrieving subscriber location information; a status server connected to said web server for receiving said modem status request and transmitting said request to said integrator whereby said integrator interprets said modem status request and retrieves corresponding subscriber location information and

transmits said corresponding subscriber information to said status server, said status server thereby converts said corresponding subscriber information to a central office DSLAM request and sends said central office DSLAM request to said central office DSLAM, said central office DSLAM responds to said request and transmits a status signal to said status server and said status server transmits said signal to said webserver which converts said signal to a readable format on said internet website interface for viewing by said internet service provider.

12. A method for verifying modem status for an telecommunications service provider in a communications network serviced by a central office, the method comprising: connecting to an internet interface;

transmitting a modem status request to the internet interface; transferring said modem status request from the internet interface to a server;

transmitting said modem status request from said server to an integrator whereby said integrator interprets said modem status request and retrieves corresponding subscriber information;

transmitting said corresponding subscriber information to said server;

converting said corresponding subscriber information to a central office request;

sending said central office request to said central office; querying modem status of a customer and creating a status signal;

transmitting said status signal to said server;

transmitting said status signal from said server to said internet interface; and

converting said status signal to a readable format for said telecommunications service provider.

13. The method of claim 12 wherein connecting to said internet interface further comprises connecting to a web server having an internet web site resident therein containing a list of telecommunications service provider customers.

14. The method of claim 13 wherein transmitting said modem status request further comprises designating of a customer from said list of telecommunications service provider customers.

15. The method of claim 12 wherein converting said corresponding subscriber information to a central office request further comprises converting said corresponding subscriber information to a SNMP request corresponding to a DSLAM located at the central office.

16. The method of claim 12 wherein converting said status signal to a readable format for said telecommunications service provider further comprises converting the status signal to a web site interface screen indicating a status in real time.

17. A method for verifying modem status for an internet service provider in a digital broadband network serviced by a central office, the method comprising:

connecting to a webserver having an internet website interface;

transmitting a modem status request to the webserver via said internet website interface;

transferring said modem status request from the webserver to a status server;

transmitting said modem status request from said status server to an integrator whereby said integrator interprets said modem status request and retrieves corresponding subscriber location information;

transmitting said corresponding subscriber location information to said status server; converting said corresponding subscriber location information to a central office DSLAM request;

sending said central office DSLAM request to said central office;

querying modem status of a customer and creating a status signal;

transmitting said status signal to said server; transmitting said status signal from said status server to said web server; and

converting said status signal at said web server to a website interface for communication to said telecommunications service provider.

18. The method of claim 17 wherein converting said status signal to a website interface for communication to telecommunications service provider further comprises converting the status signal to a web site interface screen indicating a status in real time for viewing via an internet connection.

ABSTRACT OF THE DISCLOSURE

A system for verifying modem status for a telecommunications service provider in a broadband network serviced by a central office. The system comprising an internet interface for receiving a modem status request from the telecommunications service provider via a telecommunications network and an integrator capable of retrieving subscriber information and a server connected to the internet interface for receiving the modem status request and transmitting the modem status request to the integrator. The integrator interprets the modem status request and retrieves corresponding subscriber information and transmits the corresponding subscriber information to the server, the server thereby converting the corresponding subscriber information to a central office request and sending the central office request to the central office. The central office responding to the request and transmitting a status signal to the server and the server transmitting the signal to the internet interface which converts the status signal to a readable format for the telecommunications service provider.

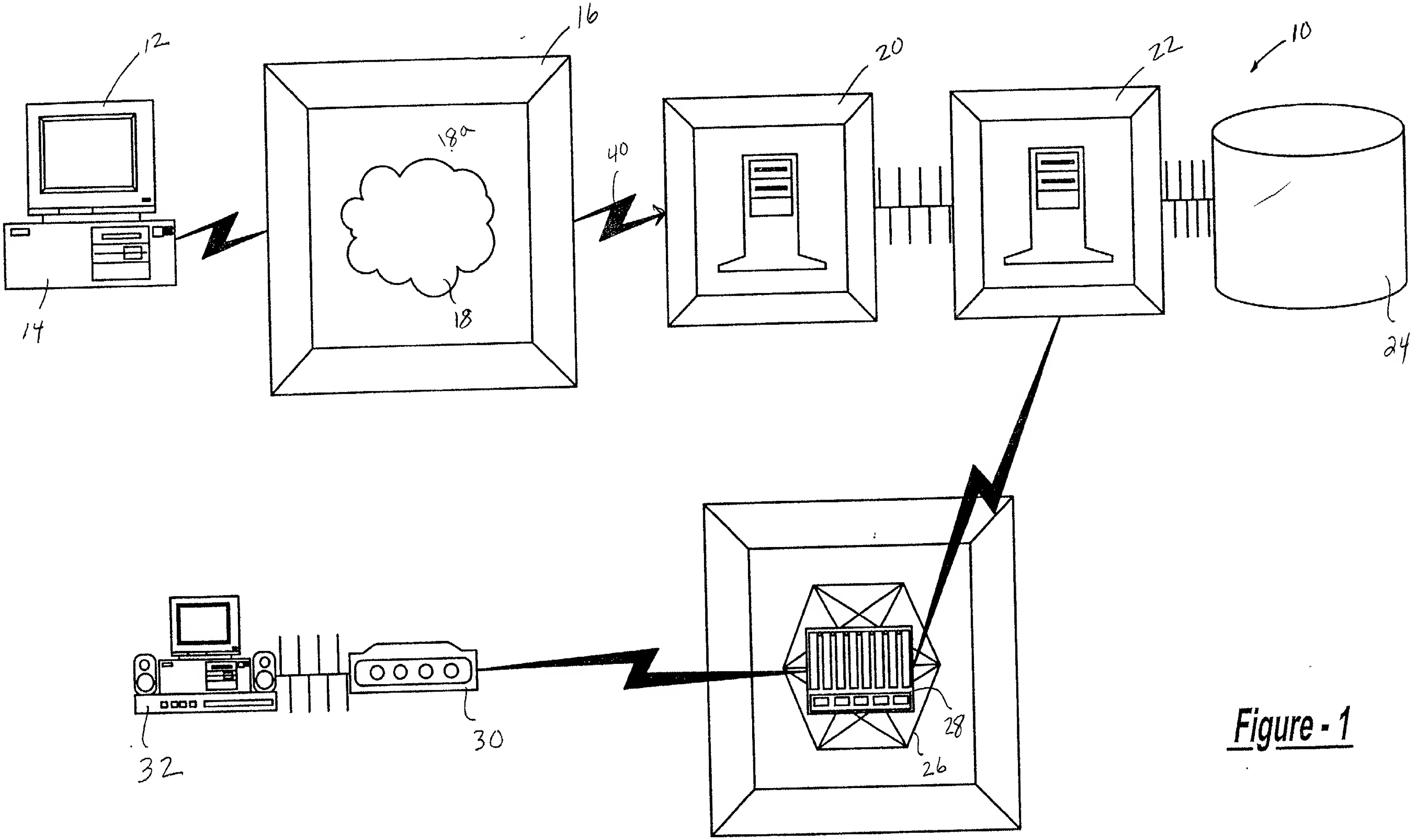


Figure - 1

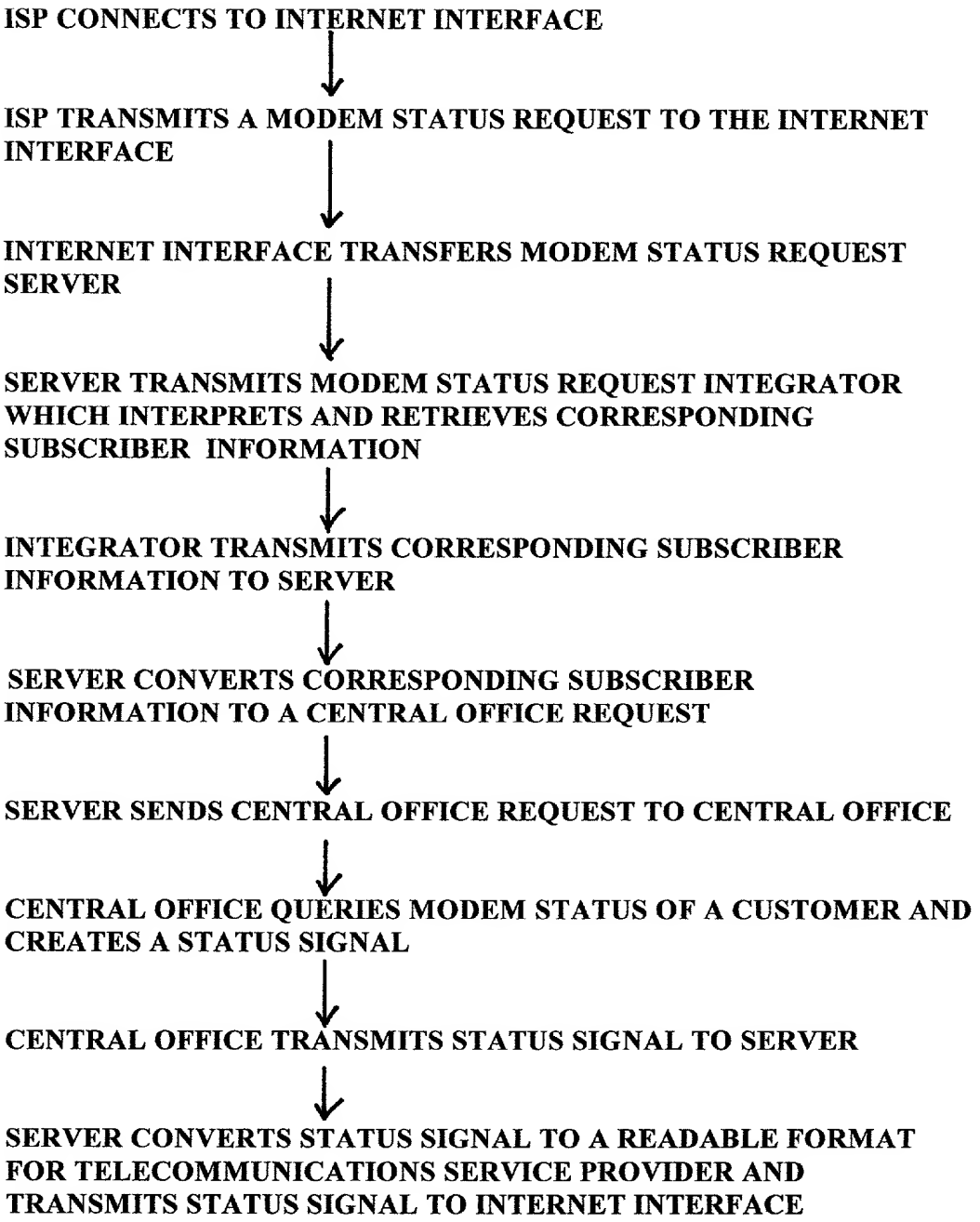

ISP CONNECTS TO INTERNET INTERFACE
ISP TRANSMITS A MODEM STATUS REQUEST TO THE INTERNET INTERFACE
INTERNET INTERFACE TRANSFERS MODEM STATUS REQUEST SERVER
SERVER TRANSMITS MODEM STATUS REQUEST INTEGRATOR WHICH INTERPRETS AND RETRIEVES CORRESPONDING SUBSCRIBER INFORMATION
INTEGRATOR TRANSMITS CORRESPONDING SUBSCRIBER INFORMATION TO SERVER
SERVER CONVERTS CORRESPONDING SUBSCRIBER INFORMATION TO A CENTRAL OFFICE REQUEST
SERVER SENDS CENTRAL OFFICE REQUEST TO CENTRAL OFFICE
CENTRAL OFFICE QUERIES MODEM STATUS OF A CUSTOMER AND CREATES A STATUS SIGNAL
CENTRAL OFFICE TRANSMITS STATUS SIGNAL TO SERVER
SERVER CONVERTS STATUS SIGNAL TO A READABLE FORMAT FOR TELECOMMUNICATIONS SERVICE PROVIDER AND TRANSMITS STATUS SIGNAL TO INTERNET INTERFACE

FIGURE 2

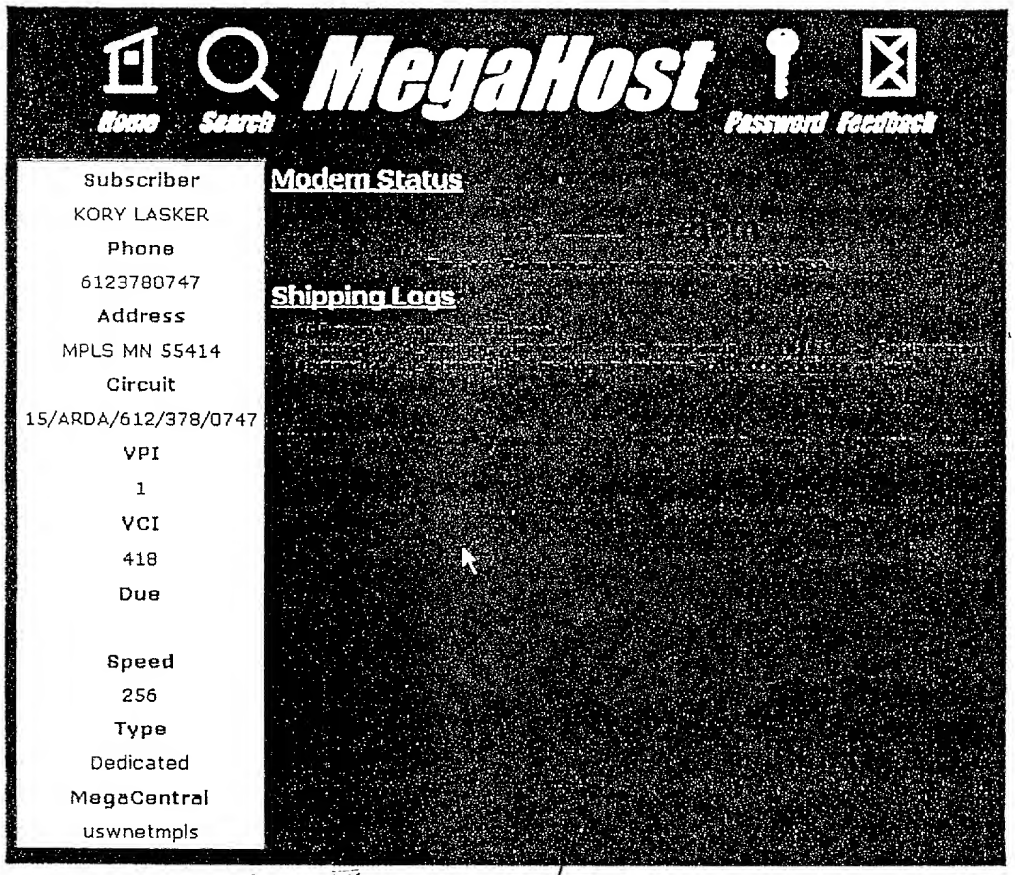
Name	Phone
DAENZER,BARBARA	6128240534
KILLION,KYLE	612 790-2293 CBR 612
AARON FLORIN	612-333-8774 EXT., AARON
JEFF OWENS	612-930-1060 EXT., JEFF
E J LINCK	612-379-3805 EXT. 107,
TERRY BYRNES	612-890-8196 EXT., TERRY
M S GJETSON	651 488-7852
KEVIN CALLINAN	651-774-4593 EXT., KEVIN
TIM ZAPPIA	612-937-4422 EXT., TIM
DENNIS LOUDEN	651-698-8559 EXT., DENNIS
MASON,EUGENE	6516884782 6513785137

34

36

38

Figure 3


MegaHost
Home
Search
Password
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Subscriber
KORY LASKER
Phone
6123780747
Address
MPLS MN 55414
Circuit
15/ARDA/612/378/0747
VPI
1
VCI
418
Due
Speed
256
Type
Dedicated
MegaCentral
uswnetmpls
Modem Status
Shipping Logs

Figure 4